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Dating Magdalenian art in North Spain: the current situation.

César González Sainz
Dpto. CCHH - IIPC, Universidad de Cantabria

1. Introduction. The graphic activity of Magdalenian human groups forms the most spectacular part of the archaeological record in Cantabrian Spain and, at the same time, represents probably the most expressive aspect of the culture of those Upper Palaeolithic hunters. Since the early 1990s, several projects have tried to fix more precisely the chronology of the cave art through the application of radiocarbon dating by accelerator (Valladas *et al.*, 1992 and 2001; Moure and González Sainz, 2000; Fortea, 2002). The present article attempts an integrated discussion on the results of the absolute chronology for Magdalenian cave art and the present situation of the most reliable parallels between this and the mobile art of the same period.

2. Chronological ordering. It is well known that the ordering in time of cave art is rather more complex than that of decorated objects, which are dated by their archaeological context (and therefore both this context and the artefacts themselves can be dated by radiocarbon). In Cantabrian Spain, the approaches to dating cave art, especially for the Magdalenian depictions, are: the series of superimpositions known on certain walls of a few caves, the analogy with stratified mobile art, and absolute dating, essentially for this period, radiocarbon dating by accelerator. Other procedures, such as the correlation with stratigraphic sequences, are offering good results in pre-Magdalenian periods (Fortea, 1994); but are limited in the period that interests us here to just a few cases, such as Cueva del Mirón, in relation with some rather modest depictions (González Morales and Straus, 2000).

1. Series of superimposed figures of different kinds have often been described, on panels in a limited number of cave sites. In Cantabrian Spain, the main examples are found in the caves of La Peña del Candamo, Tito Bustillo, Llonín, Altamira, El Castillo, La Pasiiega and La Garma Lower Passage. In other words, the main cave art centres, repeatedly used over long periods in the Upper Palaeolithic. These sites tend to differ quite clearly from the other cave art sites, which are more or less synchronic internally (they have a much lower number of depictions which, above all, are more homogeneous in style and techniques). The more complex centres referred to above may have been true points of reference for the Palaeolithic populations, especially in the later phases of the Upper Palaeolithic that interest us here.

2. The analogy with mobile art is the part of the procedure for "stylistic" chronological ordering that is most acceptable at the present. As well as the comparison, in both kinds of art, of technical procedures, themes and iconography, perspective, formulas of animation, treatment of the bodies, etc., the most fertile approach, in order to establish chronological inferences, is the comparison of motifs that are identical (except in their size) in both art-forms. These motifs are defined as the same theme represented with a determined formal and technical treatment, and in second place, as normalised motifs, frequently reproduced in several different sites.

We shall now explain in greater detail the two clearest and most effective cases for establishing cave art chronology, bringing up to date an earlier discussion (González Sainz, 1993):

2.1. Naturalistic, and at the same time, highly simplified figures representing hind's heads, with striated bands in their chins and necks, are commonly found on flat mobile surfaces (until now, only on scapulae). The aim is not to date the technical procedure of striation, which is known in several regions in the Iberian Peninsula from the Solutrean (and it can currently be expected from even earlier periods) to the end of the cycle of Palaeolithic cave art. Rather, it is to date this particular motif, especially adapted to flat surfaces and reproduced assiduously in several sites in the centre of Cantabrian Spain.

In its mobile version, these such conventional engravings of hinds and, more rarely, stags, have been discovered on scapulae from early Magdalenian levels in Altamira (the doubt about their stratigraphic position was adequately cleared up with the dating of one of them (GifA-900057: $14,480 \pm 250$ BP - Valladas *et al.*, 1992), El Castillo (level 8), El Cierro ("Magdalenian" level), El Juyo (level 8), El Mirón (level OV-17) and without stratigraphic context in El Pendo. The relatively abundant data coincides in situating the development of these engravings in the early Magdalenian, with direct dates for one of the Altamira scapulae, as mentioned above, or dates of association (the level OV-17 in El Mirón is dated to between $15,700 \pm 190$ and $14,550 \pm 160$ BP, while level 8 in El Juyo is situated between the dates available for level 11: $15,300 \pm 700$ and for level 7: $14,440 \pm 180$ BP) which are clearly coherent.

In its parietal version, this motif is located in at least seven cave sites, and in interior contexts of different types. It is sometimes found, grouped in specific chambers or walls, separated from the rest of the decorated zones; hence, concentrations of these engravings of hinds and stags with the typical striations are seen in the Zones IV and X in Altamira, in Sector B7 in La Pasiega, and more occasionally in B5, on the right hand walls of the "Main Hall" in El Castillo, prolonged in the walls of the passage leading to the "Second Hall" in the cave, as well as in the chambers 1c and 1f in La Garma Lower Passage. In other cases they are walls with more complex accumulations of figures, where the hinds appear over or beneath other depictions (Chamber I in Altamira, main wall in Zone X in Tito Bustillo, walls in Sector C3 of La Pasiega, and the start of the "Gallery of the Hands" in El Castillo). This same motif was also produced in other caves with a fewer number of figures, such as Los Emboscados, Las Aguas and Cibrante.

There is a notable geographical coherence to the distribution of the motif in its cave and mobile versions: located so far in the central part of Cantabrian Spain. In a less restrictive consideration of the motif, it can be assimilated with cave figures that are similar in their technical aspects, and found in the whole area, from La Peña de Candamo to Alkerdi; but the chronological precision of the parallel is reduced at the same time as we relax the definition of the motif. In fact, as alluded to above, the technique of striation can be supposed to have a much longer chronology in the region than that of the motif being studied.

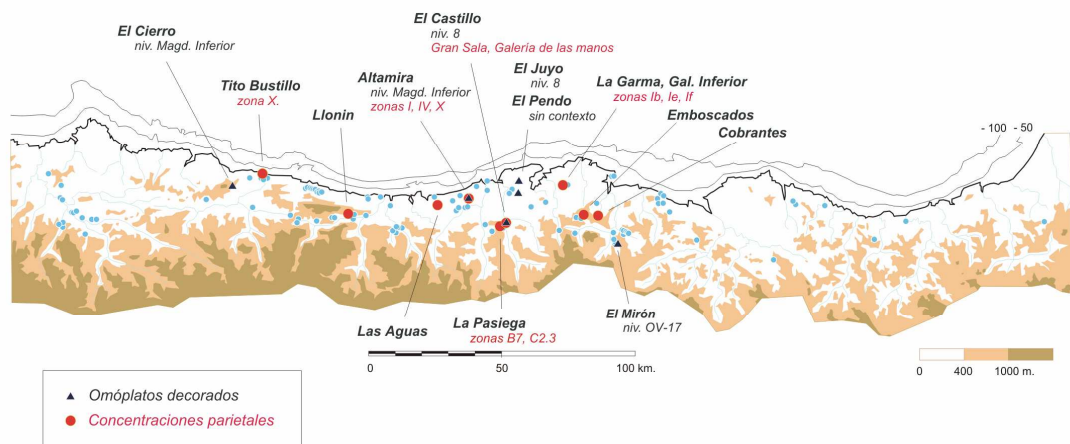


Figure 1. Figures of hinds with striated bands in their heads and chests, both on cave walls and on scapulae (ca. 15.700–14.000 BP, Early Magdalenian)

2.2. The highly schematic figures of ibex viewed from the front or, although more unusual and occasionally of doubtful interpretation in Cantabrian Spain, of female figures seen in profile (of the Gunnersdorf-Lalinde type), can be identified in their mobile version from levels of the middle Magdalenian period, but become especially frequent in the late and final Magdalenian (between 13.3/13.2 and 11.6 ky BP). Unlike the previous motif, the geographical distribution of these schematic figures goes far beyond the regional boundaries, both in their mobile and cave version, and they are much more polarised towards portable objects, with very few examples on cave walls in the region (the clearest figures are schematic ibex seen from the front, in the caves of El Otero and Ekain).

The identification of other motifs on both kinds of surfaces is more problematic, as they are not so common, with a smaller degree of normalisation. So the identification of these motifs in both versions is more controversial. I am referring, for example, to lines on mobile artefacts and the "tectiforms" (a term which, to be exact, should be discarded in Cantabrian Spain; *vid.* González Sainz, 1993) on cave walls, or equally, to the combinations of longitudinal and oblique lines, and scaliform or ladder-like compositions, etc.

3. In recent years, radiocarbon dating has been applied to a large number of decorated artefacts and cave art (about a hundred dates are now available, including non-figurative charcoal marks, in many cases of Medieval chronology). Although dating parietal art has its problems, and is much more complex than was expected in the period between 1992 and 1997 when the technique was first applied in Cantabrian Spain (Moure *et al.*, 1996; Fortea, 2002), the procedure has provided a large series of dates, many of which are perfectly acceptable. They therefore give greater precision and consistency to the scheme of chronological ordering for this graphic activity in the region during the Magdalenian. At least, despite a few problems which have not been solved, the dates obtained in cave centres like Covaciella, Altamira, Castillo, La Pasiega, Las Monedas and La Garma Lower Passage match their expected results based on the style of the figures; and other dates for certain figures of more recent phases in La Peña de Candamo and even Llonín are also very useful.

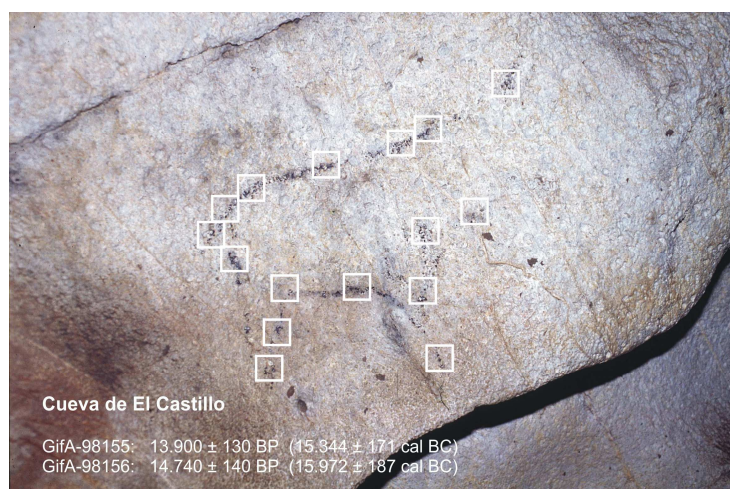
In contrast, there are greater problems with the assessment of the dates obtained in El Buxu, Pindal, Tito Bustillo, Sotarriza, Santimamiñe and Ekain. In many cases, the dates for these sites not only contrast with what was expected from the style of the art, but they are also contradictory among themselves (for the same figure, for figures in the same, apparently synchronic group and, in some cases, for results from the same original sample, divided in the

laboratory). In compositions that are apparently synchronic, such as the horses and reindeer in Chamber X in Tito Bustillo, there are noticeable differences between the dates obtained from different laboratories, for figures in the same group. It should be pointed out that, among the dates that are difficult to accept, obtained for figures whose style indicates a Magdalenian chronology, the results are systematically more recent, or later than 11,500 BP (which suggests that there is not enough monitoring for contamination by recent carbon), and the dates are never doubtful because they are too old (more than 17,000 BP). The results from Cueva de las Chimeneas, which we also consider doubtful, were the object of another discussion (Moire *et al.*, 1996:317-320).

We will now attempt to make an assessment of the available C14-AMS dates for Magdalenian cave art, organised according to the most important phases for the period in the region. The discussion is centred on the cave sites with the less problematic dates, although we will also refer to the others. We use the dates in uncalibrated BP chronology, but the dates calibrated with the CalPal-2004 curve (Weninger, B.; Jöris, O.; Danzeglocke, U., 2004), and the bibliographic source of the date, omitted from the text, are listed in the Appendix.

3.1. Older Magdalenian (initial and early: 17.0/16.6 to 14.4/14.2 ky BP). Radiocarbon dates attribute to this period some very different kinds of cave art, in the caves of Peña de Candamo, Altamira and El Castillo. In the first of these, as well as colour stains and black lines (GifA-98193: 16,470 \pm 280 BP) and some re-painting of much older figures, we can consider some animal figures, drawn in black and engraved, such as one of the large aurochs in the Wall of the Engravings, with two contradictory results. One, of charcoal, is very recent (GifA-96137: 10,810 \pm 100 BP), contrasting with the date for the acid-humic fraction, which sends the figure back to the Solutrean-Magdalenian transition (GifA-96150: 17,180 \pm 310 BP).

Another figure that is situated in the very early Magdalenian, or even in the Solutrean, is a horse, outlined in black and facing right, of which now only the cervical-dorsal line, croup, anterior part of a rear leg and a convex belly can be seen; in Cueva de El Castillo (Gallery of the Hands, No. 27/28 in the 1911 publication). It has two dates, whose standard deviations do not overlap (GifA-98153: 16,980 \pm 180 and GifA-98154: 19,140 \pm 230 BP). The same cave has the slightly more recent figure of an isolated ibex in the main passage (No. 56 in 1911, on the left hand wall in the passage between the Second and Third Chamber, with two dates: GifA-98155: 13,900 \pm 130 and GifA-98156: 14,740 \pm 140 BP) (fig..2)



(fig.2. Cueva de El Castillo. Ibex n° 56)

Most of the radiocarbon information for the old Magdalenian comes from Altamira, where a series of dates ranging between 16,500 and 14,500 have been obtained for the "Black Series" (as named by Leroi-Gourhan, 1965); drawings of animals and signs in black in different areas of the interior of the cave. These match the chronology of the occupations of the site during the Magdalenian (which does not imply that all the decoration in the cave is of Magdalenian age, as has occasionally been suggested). These paintings are: a series of black non-figurative lines ($16,480 \pm 210$), a group of quadrilateral signs in the first part of the final passage "The Horse's Tail", or Zone IX ($15,440 \pm 200$), a hind's head in Chamber VI ($15,050 \pm 180$) and a black line cut by the striated engraving of a hind in Chamber IV ($14,650 \pm 140$).

Finally, several samples have been taken of the principal figures on the ceiling of Chamber I in Altamira: three figures of bison, numbered XXXIII, XXXVI and XLIV in the 1935 monograph. The first two are large polychrome paintings, and the third a smaller bison only painted in black. Owing to differences between the results for charcoal and the acid-humic fraction (which, contrary to what was expected, is older in many cases; see a full discussion in Moure *et al.*, 1995: 301), the chronology cannot be assessed precisely, but the dates do allow a general approximation. In our opinion, there are two possibilities:

a) considering all the dates and assuming that the acid-humic fraction dates should be similar or slightly more recent than the charcoal ones. The entire group of animal figures on the left of the chamber could be synchronic, and produced some time between 14,820 and 14,250 BP, towards the end of the early Magdalenian.

b) if we consider the charcoal dates, and not the acid-humic fraction ones, there could be a difference in time between the production of the large polychrome animals (bison XXXIII and XXXVI) and the other smaller figures only painted in black (bison XLIV). The former would have been painted between 14,820 and 13,940 BP, with a mean - which could give a guideline - for the four dates of 14,472 BP. In contrast, the bison XLIV (and another very similar one facing it) would have been added to the composition of polychromes, filling in a gap between the large bison, and maintaining the spirit of the composition, in 13,570 or 13,130 BP, now in a late moment of the middle Magdalenian, and when the cave vestibule, as far as we know, was no longer occupied as a habitation site.

In any case, the time when at least the polychrome figures, and possibly all the large figures in the composition were painted, corresponds to the end of the early Magdalenian, and is frankly difficult to separate from that of other figures with very similar dates, but more clearly assignable to the middle Magdalenian, in Covaciella, Llonín, El Castillo, Pasiega C or La Garma Lower Passage. In fact, the calibration of the dates tends to make it even more difficult to separate the large composition in Altamira from the cave art dated in the middle Magdalenian, as has often been argued from the stylistic point of view.

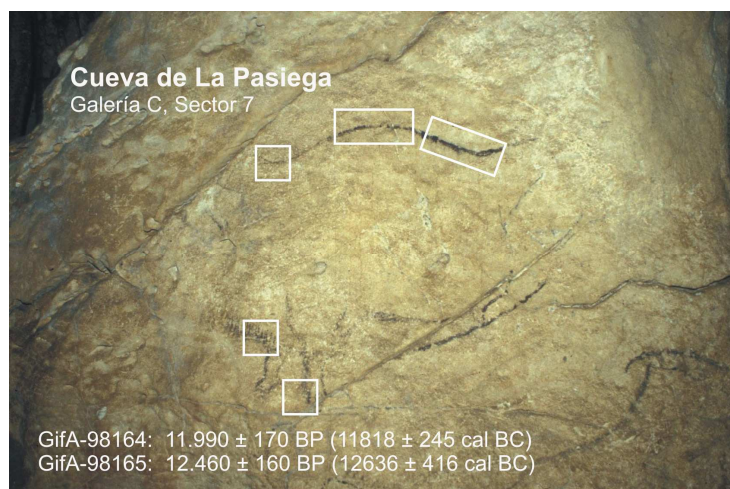
3.2. Middle Magdalenian. A large number of dates for black paintings are concentrated in this period, with a chronology of 14.4/14.2 to 13.3/13.2 ky BP in Cantabrian Spain. Out of the Asturian sites, the results from Covaciella are particularly coherent, with dates for charcoal and the acid-humic fraction for two bison (Fortea *et al.*, 1995: 268) indicating an age at the start of the middle Magdalenian, between 14,260 and 14,060 BP. This agrees with the stylistic coherence for the whole composition. In the same way, some of the engraved and black figures on the Wall of the Engravings in La Peña de Candamo correspond to a very similar moment. One of the best known figures in the group, a wounded stag with its head raised, apparently roaring, was dated to $13,870 \pm 120$ BP (GifA-98172).

The results from the Main Panel in Cueva de Llonín are more difficult to assess. But it seems reasonable to assume a middle, or possibly late, Magdalenian chronology for one of

the bison in the cave (n°4, samples LL-4 and LL-28) of a clear Magdalenian style. According to the logic of the dates, the older result is more probable (GifA-98205: 13,540 ± 170 BP), taking into account the acid-humic fraction (GifA-98206: 13,260 ± 220 BP), than other samples which offered results that are much more recent and difficult to accept.

In the centre of the region, several sites contain figures, in nearly all cases bison, corresponding to this period. We have already mentioned the possibility (arising if we only consider the charcoal dates) that some small bison were added to the composition of polychromes in Altamira during the middle Magdalenian, around 13,570 or 13,130 BP. The assessment of results from the caves of El Castillo and La Pasiega (Gallery C), both in Puente Viesgo, is also relatively complex. As many as 14 dates were obtained in El Castillo for four bison located on what Alcalde del Río, Breuil and Sierra called "The Frieze of Polychromes" in 1911. In fact, these figures are not polychromes nor are they positioned in a single frieze. One of them (bison 19, in 1911; painted in black and without engraving) is isolated on the left, while another two (18a and 18b), closely juxtaposed, larger and more complex, are superimposed on older figures in the same panel (negative handprints, signs, hinds...). A fourth bison (18c) is placed on a separate wall to the right of the others. It is the most complex, technically speaking, not only drawn in black and engraved but also with ochre-brown pigment added in the upper part of the body.

The assessment of the results at the present time (with 10 dates that were not available at the time of the previous study, by Moure *et al.*, 1996: 307), still supports the idea proposed before: the probable differentiation of their production in two moments. The smaller bison No. 19 was painted near the end of the middle Magdalenian, between 14,090 and 13,510 BP, while the other two central figures were produced later and possibly at the same time (as suggested by their greater technical and stylistic homogeneity and their juxtaposed position), probably about 13,000 or 12,900 (the mean of the three dates for figure 18a is 13,066 BP, very close to the date for 18b of 12,910 ± 180 BP). They correspond therefore to the start of the late Magdalenian. Lastly, the bichrome bison on the right has given four dates for charcoal that are too recent (all later than 11,300 BP, i.e. at a time when no figurative mobile art has been found in any of the numerous sites dug in the region, in the Azilian period). Only the date for the acid-humic fraction (GifA-95375: 12,390 ± 190 BP) could indicate the moment of the addition of this bison, in the late-final Magdalenian, to the figures that had already been painted, although its synchronicity with the pair of bison 18a-18b cannot be ruled out.



(fig.3. Bison in a Magdalenian style, in sector C7 in Cueva de La Pasiega)

Four dates were obtained for two figures in Gallery C in Cueva de La Pasiega: the ibex (n°67 on the 1913 plan; sector C8 in Balbín and González Sainz's revision) and bison (n°88 in 1913; sector C7) (fig. 3). The two dates of the former figure are quite coherent and situate the production of this ibex figure (and probably the surrounding figures, very similar from a technical, stylistic and compositional point of view) to the start of the middle Magdalenian. Most of the sample was taken from a hole in the cave wall, full of charcoal, and coinciding with the animal's belly. According to the laboratory (H. Valladas, personal communication) the weight of the processed sample (540 and 1210 mg) was ideal.

However, the two dates obtained for the bison in sector C7 are somewhat contradictory and noticeably more recent, in both cases corresponding to the late Magdalenian. At first sight, as in the neighbouring cave of El Castillo, this could indicate the continuity in the decorative process in certain sectors, in phases of the middle and late-final Magdalenian. However, this possibility is in disagreement with the synchronicity that the decorated walls in sectors C7 and C8 seem to display, based on the homogeneity in the style, the same use of technical procedures, their proximity in the cave and the choice of walls at a low height above the floor (in contrast with the rest of Gallery C). The weight of the processed sample was, in this case, of 290 and 390 mg respectively, which is below the recommended weight according to H. Valladas. So we need not rule out totally the possible synchronicity, in the middle Magdalenian, of these two panels in La Pasiega C.

Finally, from La Garma Lower Passage, we currently have a single date available for a figure of a bison situated at the end of the passage (Zone IX), although more samples have been taken (fig. 4). The result is quite coherent with the figure's style and the dates obtained from occupation floors, at different points along the present floor of the passage (González Sainz, 2003), also corresponding to the middle Magdalenian.



(Figure 4. Bison in a vertical position, in Zone IX, in La Garma Lower Passage)

3.3. Late-final Magdalenian (13.3/13.2 to 11.8/11.6 BP). With the radiocarbon dates, and as discussed above, the continuity in the construction of certain subgroups, begun in the middle Magdalenian and continued in the late-final phase, is clear in Cueva de El Castillo (composition of bison) and at least possible in Pasiega C. Something similar happens in La Peña de Candamo, where depictions appear to have been produced until 12,000 BP: black non-figurative lines, beneath the striated bison No.27, of a clear Magdalenian style, and located in the centre of the main panel in the Wall of the Engravings, were dated to 12,260 ± 100 BP (GifA-98195, in Fortea 2002: 9-10).

Among the synchronic sites, the one that most clearly belongs to these late phases of the Magdalenian is Cueva de Las Monedas. Dates are available for the horse n° 20 (GifA-95360: $11,950 \pm 120$ BP) and for the ibex n° 16 (GifA-95203: $12,170 \pm 110$ and GifA-95284: $11,630 \pm 120$ BP). The relative proximity of the dates allows this assemblage, noticeably homogeneous stylistically, to be situated in a late moment of the Magdalenian (the mean of the three central dates is 11,916 BP), as has always been suggested for this assemblage, not so much because of its stylistic character as for the iconographical composition, with several reindeer.

In any case, the dates for Las Monedas and Peña de Candamo show that cave art in a clear Magdalenian style continued until 12,000 BP at least. Very few generations later, in about 11,600 BP, the human populations in Cantabrian Spain display a noticeably different graphic behaviour. Figurative mobile art, which had been so abundant until then, became restricted to abstract designs on a few types of tools and stone cobbles. A large number of Azilian deposits have been dug in the region, with an adequate degree of conservation of bone or antler materials. So taphonomical factors, or an unequal archaeological knowledge of the two periods, cannot be given as explanations for such a noticeable change in graphic expression. Even though an artefact with figurative art might be found in an Azilian context in the future - some doubtful examples have already been noted - this would not affect the profound contrast with the abundant figurative mobile art (and cave art, as in Las Monedas and La Peña de Candamo) of late Magdalenian deposits.

To leave Cantabrian Spain momentarily, a similar decline in the figurative art of Magdalenian populations can be seen in all regions in S.W. Europe with a sufficient archaeological record, although with some variations. Outside the Cantabrian-Pyrenean region, figurative decoration is somewhat less unusual (in Quercy or on the Spanish Mediterranean coast), but at least in France, the few figurative depictions display a stylistic character that is relatively different from in the Magdalenian period (*vid.*, Guy, 1997).

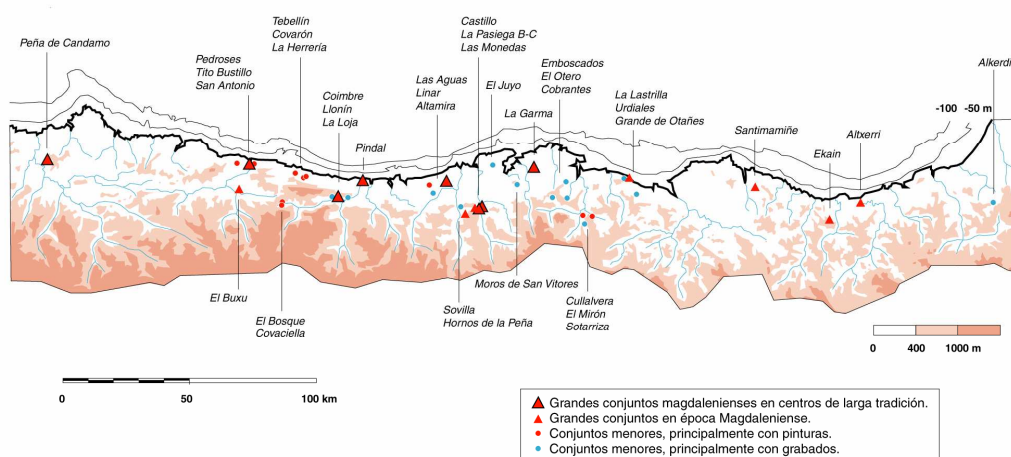
For these reasons, we do not think it reasonable to consider some very recent dates obtained for a number of figures in a Magdalenian style. In some cases, they are figures integrated in groups where other dates are available or which have other non-stylistic arguments in favour of their Palaeolithic, and very probably Magdalenian, chronology. We are referring to dates, of about 10,000 BP for black signs in Llonín (beneath striated engraved hinds), another two dates for a stag in El Pindal with a similar chronology, black non-figurative lines at the back of the area - Chamber IV - with three horses in a Magdalenian style in Cullalvera ($10,400 \pm 90$), a couple of figures of cervids in El Buxu, dated in $9,130 \pm 170$ BP, the horse in Sotarriza (GifA-98170: $8,890 \pm 90$), and some of the dates obtained in the sites of Tito Bustillo and Ekain, with important internal contradictions. The results obtained for the more recent phases in Tito Bustillo and for the assemblage in Ekain (*vid.* Appendix), in a necessarily selective and brief assessment, can be considered as very close to the traditional chronological assessment, based on their style, which situated this art in the middle or late phases of the Magdalenian, but they do not allow any further approximations.

3. Discussion.. Despite the problems seen in the assessment of a significant number of radiocarbon samples, the integration and contrast between the absolute dates and procedures for the relative ordering in time, applied to Magdalenian art in Cantabrian Spain, now allows us, in my opinion:

1. To confirm in its essential nature, the most characteristic features of Magdalenian art, proposed in the past by authors such as H. Breuil, F. Jordá or A. Leroi-Gourhan, among others. The basic features are the more naturalistic treatment of the animal figures, often

somewhat less simplified, and with greater care in expressing volume or the third dimension. The results, in a very general assessment, do not disagree with this definition of Magdalenian cave art, nor with the traditional chronological attributions (at least, not in the way they do for Pre-Magdalenian art, where the variations with the traditional view appear to be more important. *vid.* González Sainz and San Miguel, 2001: 162 and following). This difference in the validity of the traditional chronological proposals for Archaic art and Magdalenian art is understandable taking into account the greater security of the traditional chronological bases for Magdalenian art, because of the abundance of mobile art in S.W. Europe from this period and the analogies established with cave art. It may also be due to the apparently greater cultural integration and artistic homogeneity, between Cantabrian Spain and S.W. France, with more widespread and recognisable graphic conventions in the Magdalenian period. The concentration of nearly all the dates obtained by C14-AMS in Magdalenian figures (owing to the much more common use of charcoal in paintings), increases the difference in our chronological precision for cave art during these two main periods in the region.

Because of this, we consider it possible to isolate or separate with a reasonable degree of certainty, the graphic representations in caves belonging to the latter period (from 17.0/16.5 to 11.6 ky BP) from those of the earlier age (Archaic or Pre-Magdalenian Art) (fig. 5).



(Figure 5. Distribution in the region of cave sites of Magdalenian age. Some categories)

2. Rather than solve certain problems (e.g. the exact age of the polychromes, or of the late claviform signs), for the moment, absolute dating is assisting in focusing on the right questions and the limitations of some traditional work procedures. Thus, for example, how we work with series of superimpositions. The relative similarity of the series of superimpositions in complex panels in La Peña de Candamo, Tito Bustillo, Llonín, Altamira, Castillo and Pasiega B-C, led to the attempt at defining successive artistic phases throughout the Magdalenian, which on occasions seemed exclusive and closed. When comparing the succession of black figures - striated engravings - polychromes - other black figures and engravings, at various sites, we need to be extremely careful in the significance we give to this comparison. If we situate the phases of these different cave panels in parallel, in fact we are supposing that the artistic phases were closed (or, in other words, that at a certain time, in the different sites in the region, they only produced figures with one particular technique). This contrasts with the variability seen in mobile art for any phase of the Magdalenian (although this approach has not yet been developed fully in the region), and with the

radiocarbon dates now available for Magdalenian cave art. In the same way, this somewhat regulated view does not coincide with the subtlety of the changes in time seen, for example, in such a large collection of mobile art, covering a long period, as that of Parpalló (Villaverde, 1994). Lastly, and from a methodological point of view, the graphic "phases" of any cave sequence is normally based on a very small number of superimpositions, and are extrapolated to quite numerous series of figures, whose unity and synchronicity are not always clear. In reality, in many cases, these "phases" were not separated so drastically in time. To conclude, the procedure of chronological ordering, based on the superimpositions of depictions in the more complex sites in the region, is of greatest interest in reconstructing the decorative processes in a certain site, but is rather more questionable as a synthesis of graphic changes throughout the region.

3. From the perspective of time, the dates reviewed here confirm the extraordinary entity of this graphic activity in the final phase of the Upper Palaeolithic in Cantabrian Spain, both in the cave version and the mobile one. This activity becomes even more surprising, taking into account the great changes that occurred at the end of the Magdalenian, between 12,000 and 11,500 BP. In particular, they tend to highlight:

- dates for the early Magdalenian (17.0 to 14.7 ky BP, or 18.5 to 16.0 ky calBC) are relatively scarce and disperse. In part, this is because the increase in the number of datable paintings with charcoal, compared with those in red or merely engraved, is not so great as in later Magdalenian periods. As well as drawings in black (that have occasionally been dated), the art of the early Magdalenian still includes many animal figures and signs in red, and frequent engravings.

- the important concentration of cave art assemblages dated between 14.7 and 12.8 ky BP, coincides with the end of the early Magdalenian, and the middle and late phases, in the region. The length of time for this period in calendar years (it is equivalent to 16.0 to 13.3 ky calBC, or a variation in length from 1.9 to 2.7 ky when calibrated) hardly takes significance away from this concentration, which coincides with a great increase in graphic activity on portable artefacts, which become noticeably diversified.

- the prolongation in time to the end of the Magdalenian (to at least approximately 11.8/11.6 ky calBC) of an essentially naturalistic cave art (Monedas, recent phases of Peña de Candamo). Other sites which can be added to this late phase, for non-radiocarbon criteria, are the recent phases in Llonín and El Covarón, or the caves of El Bosque, Sovilla, El Otero and, with less certainty, Altxerri.

4. The available dates, however, are not enough to define specific stylistic characteristics for cave art in the early Magdalenian, in contrast with those in the middle or late Magdalenian, etc. In this respect, at present it does not seem possible to differentiate, from a merely "stylistic" point of view, between Early and Recent Style IV, accepting the full discussion made by J. Clottes (1989) for a wider geographical area. However, within the relative unity of Magdalenian art in the region, changes did occur, especially iconographical variations as we will discuss later (in line with those proposed by Leroi-Gourhan in 1965: relative increase in the figures of reindeer, fish and bears and changes in the abstract signs), or in other aspects that are easily accessible with the present information, such as the decorated mobile objects. Apparently, more purely stylistic modifications occurred (in terms of coordinated animation, composition of scenes, spread of conventions of schematisation, etc.), which have been studied less and which may not be enough to define a different "style" for the most recent Magdalenian phases.

In Cantabrian Spain, the information about Magdalenian art tends to arrange itself into two successive stages with some iconographical changes (animals and signs), and possibly in the stylistic aspects already referred to, less well-known, especially in parietal art. In any case, the turning point (or the moment of fastest change) should not be located between the middle and late Magdalenian (as was the case of the break between early and recent Styles IV, i.e. about 13.0 ky BP), but at the end of the early Magdalenian and the start of the middle Magdalenian, about 14.7/14.2 ky BP (about 16.0/15.6 ky calBC). At this moment, the role played by this graphic activity seems to have grown noticeably, becoming present in many different aspects of the everyday life of those human groups, as can be seen in the multiplication of decorated objects in stone, bone and antler, or - if the distribution of radiocarbon dates is relevant in this respect - the same multiplication in cave assemblages. These sites included large compositions of animals with increasing frequency (with a renewed role for the bison), which contrasts with the more dispersed location of figures attributed to the early Magdalenian, which have fewer large compositions (except perhaps in Peña de Candamo and Llonín). In the same way, an increase is seen in the frequency of bison, ibex and reindeer, while the number of hinds falls drastically, and figures of horses, stags and aurochs maintain their usual frequency. This apparent break in the iconographical tradition in Cantabrian Spain is accompanied by a significant change in the most common kind of abstract sign. The end of the more specifically Cantabrian signs (quadrilateral and oval signs, classic claviforms...) occurs during the old Magdalenian, whereas in the middle and late Magdalenian other signs appeared (late claviforms, in caves such as Pindal and Cullalvera) similar to those in the region of Ariège.

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Figures

Figure 1. Figures of hinds with striated bands in their heads and chests, both on cave walls and on scapulae (ca. 15.700 –14.000 BP, Early Magdalenian)

Figure 2. Cueva de El Castillo. Ibex nº 56.

Figure 3. Bison in a Magdalenian style, in sector C7 in Cueva de La Pasiega.

Figure 4. Bison in a vertical position, in Zone IX, in La Garma Lower Passage (GifA-102581: 13.780 ± 150 BP)

Figure 5. Distribution in the region of cave sites of Magdalenian age. Some categories

Appendix: C14-AMS dates for Magdalenian cave art in Cantabrian Spain.						
Ref.	Descripción	Material	Lab. - ref.	BP (1 sigma)	cal. BC CALPAL-2004	Publicación
Peña de Candamo						
CAN-14	Manchas no figs.	Carbón	GifA.98193	16.470 ± 280	17820 ± 425	Fortea, 2002:14
CAN-9	Ciervo	Carbón	GifA-98172	13.870 ± 120	15316 ± 164	Fortea 2002: 9
CAN-10	Uro a la dcha.	Carbón	GifA-96137	10.810 ± 100	10796 ± 94	Fortea 2002: 9
CAN-10	<i>id.</i>	f.a-h	GifA-96150	17.180 ± 310	18819 ± 500	Fortea 2002: 9
CAN-11	Líneas infrap. al Bisonte nº 27	Carbón	GifA-98195	12.260 ± 100	12354 ± 386	Fortea 2002: 9-10
CAN-13	Cierva nº9	Carbón	GifA-98194	9.150 ± 140	8391 ± 157	Fortea 2002: 13
Tito Bustillo						
TB-16	Bisonte XA nº3	Carbón	GifA-96096	13.320 ± 120	14409 ± 528	Fortea 2002: 22
TB-16	<i>id.</i>	Carbón	GifA-96139	13.210 ± 200	14246 ± 578	Fortea 2002: 22
TB.18	Signo XB nº12	Carbón	GifA-96099	9.940 ± 90	9456 ± 145	Fortea 2002: 22
TB.19	Cérvido XD nº 89	Carbón	GifA-96107	7.910 ± 80	6834 ± 144	Fortea 2002: 22
TB.20	Caballo XC nº56	Carbón	GifA-96095	12.490 ± 110	12654 ± 384	Fortea 2002: 22
TB.20	<i>id.</i>	Carbón	GifA-96098	12.180 ± 110	12158 ± 301	Fortea 2002: 22
TB.20	<i>id.</i>	F.a.h	GifA-96144	15.160 ± 230	16448 ± 313	Fortea 2002: 22
TB.23	Caballo XC n58	Carbón	GifA-96097	7.440 ± 60	6311 ± 63	Fortea 2002: 23
TB.23	<i>id.</i>	F.a.h.	GifA-96142	14.230 ± 130	15607 ± 199	Fortea 2002: 23
TB.23	<i>id.</i>	Carbón	GifA-96151	9.650 ± 100	9016 ± 166	Fortea 2002: 23
TB.23	<i>id.</i>	F.a.h.	GifA-96149	13.710 ± 200	14958 ± 395	Fortea 2002: 23
B3	Caballo 39		Beta-170179	11.610 ± 50	11433 ± 122	Balbín, Alcolea y González, 2003: 129
B1	Caballo 63		Beta-170177	11.140 ± 80	11048 ± 96	Balbín, Alcolea y González, 2003: 129
El Buxu						
BU-6	Co y Gamu	Carbón	GifA-98192	9.130 ± 170	8324 ± 238	Fortea, 2002: 8
Covaciella						
Cov.25	Bisonte	Carbón	GifA-95281	14.060 ± 140	15482 ± 194	Fortea <i>et al.</i> , 1995:268
Cov.25	<i>id.</i>	f.a-h.	GifA-95370	13.290 ± 140	14365 ± 537	Fortea <i>et al.</i> , 1995:268
Cov.26	Bisonte	Carbón	GifA-95364	14.260 ± 130	15628 ± 200	Fortea <i>et al.</i> , 1995:268
Cov.26	<i>id.</i>	f.a-h.	GifA-95362	13.710 ± 180	15019 ± 328	Fortea <i>et al.</i> , 1995:268
Llonín.						
LL-3	Signo nº3	Carbón	GifA-98198	10.300 ± 100	10108 ± 265	Fortea, 2002:15-18
LL-29	Signo nº3	Carbón	GifA-95303	10.070 ± 120	9650 ± 236	Fortea, 2000
LL-28	Bisonte nº4	Carbón	GifA-95147	11.900 ± 110	11715 ± 193	Fortea 2002: 1
LL-4	<i>id.</i>	Carbón	GifA-98024	12.550 ± 110	12727 ± 397	Fortea 2002: 1
LL-4	<i>id.</i>	F.a-h.	GifA-98206	13.260 ± 220	14290 ± 591	Fortea 2002: 1
LL-4	<i>id.</i>	Carbón	GifA-98205	13.540 ± 170	14651 ± 523	Fortea 2002: 19
LL-5	Puntos en hilera	Carbón	GifA-98200	10.510 ± 110	10435 ± 245	Fortea 2002: 21
LL-5	<i>id.</i>	f.a.h	GifA-98202	11.300 ± 150	11144 ± 137	Fortea 2002: 21
El Pindal						
PIN-24	Ciervo	Carbón	GifA-95539	10.240 ± 90	9970 ± 231	Fortea 2002: 21
PIN-24	<i>id.</i>	Carbón	GifA-98199	10.040 ± 100	9594 ± 199	Fortea 2002: 21
Altamira						
Bisonte XLIV dcha (Sala I)		Carbón	GifA-91178	13.570 ± 190	14674 ± 532	Valladas <i>et al.</i> 1992
<i>id.</i>		f.a-h.	GifA-91249	14.410 ± 200	15730 ± 228	Valladas <i>et al.</i> 1992
<i>id.</i>		Carbón	GifA-96067	13.130 ± 120	14185 ± 525	Moure <i>et al.</i> 1996
Bisonte XXXVI (Sala I)		Carbón	GifA-91179	13.940 ± 170	15380 ± 199	Valladas <i>et al.</i> 1992
<i>id.</i>		f.a-h.	GifA-91254	14.710 ± 200	15943 ± 222	Valladas <i>et al.</i> 1992
<i>id.</i>		Carbón	GifA-96060	14.800 ± 150	16021 ± 188	Moure <i>et al.</i> 1996
Bisonte XXXIII (Sala I)		Carbón	GifA-91181	14.330 ± 190	15677 ± 224	Valladas <i>et al.</i> 1992
<i>id.</i>		f.a.h.	GifA-91330	14.250 ± 180	15623 ± 219	Valladas <i>et al.</i> 1992
<i>id.</i>		Carbón	GifA-96071	14.820 ± 130	16040 ± 175	Moure <i>et al.</i> 1996
Línea bajo cierva nº15 (IV)		Carbón	GifA-96059	14.650 ± 140	15901 ± 196	Moure <i>et al.</i> 1996

Cierva nº 35 (Zona VI)	Carbón	GifA-96062	15.050 ± 180	16339 ± 283	Moure <i>et al.</i> 1996
Trazos negros nº 52	Carbón	GifA-96061	16.480 ± 210	17834 ± 385	Moure <i>et al.</i> 1996
Signos nº 57ª (Zona X)	Carbón	GifA-91185	15.440 ± 200	16646 ± 289	Bernaldo de Quirós 1994: 265
El Castillo					
Caballo nº 27/28	Carbón	GifA-98153	16.980 ± 180	18429 ± 276	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-98154	19.140 ± 230	21100 ± 318	Moure y González Sainz, 2000
Cabra nº 56	Carbón	GifA-98155	13.900 ± 130	15344 ± 171	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-98156	14.740 ± 140	15972 ± 187	Moure y González Sainz, 2000
Bisonte nº 19	Carbón	GifA-95108	13.570 ± 130	14780 ± 423	Moure <i>et al.</i> 1996
<i>id.</i>	Carbón	GifA-95109	13.520 ± 120	14689 ± 466	Moure <i>et al.</i> 1996
<i>id.</i>	Carbón	GifA-98151	14.090 ± 150	15507 ± 200	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-98152	13.710 ± 140	15109 ± 227	Moure y González Sainz, 2000
<i>id.</i>	f.a.h.	GifA-98159	13.510 ± 190	14586 ± 558	Moure y González Sainz, 2000
Bisonte nº 18a-pata	Carbón	GifA-91004	13.060 ± 200	14054 ± 612	Valladas <i>et al.</i> 1992
<i>id.</i>	Carbón	GifA-96068	13.520 ± 130	14673 ± 482	Moure y González Sainz, 2000
Bisonte nº 18a-ventre	Carbón	GifA-96079	12.620 ± 110	12833 ± 416	Moure y González Sainz, 2000
Bisonte nº 18b	Carbón	GifA-91172	12.910 ± 180	13789 ± 665	Valladas <i>et al.</i> 1992
Bisonte nº 18c	Carbón	GifA-95136	10.510 ± 100	10442 ± 236	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-95146	11.270 ± 110	11116 ± 114	Moure y González Sainz, 2000
<i>id.</i>	f.a.h.	GifA-95375	12.390 ± 190	12563 ± 439	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-96077	10.720 ± 100	10674 ± 160	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-96078	10.740 ± 100	10712 ± 134	Moure y González Sainz, 2000
La Pasiega. Galería C					
Cabra nº67 (sector C.8)	Carbón	GifA-98166	13.730 ± 130	15154 ± 198	Moure y González Sainz, 2000
<i>id.</i>	f.a.h.	GifA-98169	13.890 ± 200	15319 ± 228	Moure y González Sainz, 2000
Bisonte nº 88 (Sector C.7)	Carbón	GifA-98164	11.990 ± 170	11818 ± 245	Moure y González Sainz, 2000
<i>id.</i>	Carbón	GifA-98165	12.460 ± 160	12636 ± 416	Moure y González Sainz, 2000
Las Chimeneas					
Líneas sueltas, panel signos n14	Carbón	GifA-95230	13.940 ± 140	15380 ± 180	Moure <i>et al.</i> , 1996
Ciervo, nº 20	Carbón	GifA-95194	15.070 ± 140	16350 ± 261	Moure <i>et al.</i> , 1996
Las Monedas					
Caballo nº 20	Carbón	GifA-95360	11.950 ± 120	11768 ± 206	Moure <i>et al.</i> 1996
Cabra nº 16	Carbón	GifA-95203	12.170 ± 110	12136 ± 291	Moure <i>et al.</i> 1996
<i>id.</i>	Carbón	GifA-95284	11.630 ± 120	11462 ± 161	Moure <i>et al.</i> 1996
La Garma. Galería Inferior					
Bisonte vertical, Zona IX	Carbón	GifA-102581	13.780 ± 150	15208 ± 199	inédita
La Cullalvera					
Trazos no figs. (Sala IV, nº 4)	Carbón	GifA-96261	10.400 ± 90	10307 ± 236	Moure y González Sainz, 2000
Sotarriza					
Caballo nº 1	Carbón	GifA-98170	8.890 ± 90	8022 ± 157	Moure y González Sainz, 2000
Santimamiñe					
Bisonte	Carbón	GifA-98173	840 ± 60		Moure y González Sainz, 2000
Ekain					
EK-2	Caballo, I/ nº9	Carbón	GifA-96080	11.310 ± 90	11134 ± 112
EK-4	Caballo II/ nº 45	Carbón	GifA-95192	4.930 ± 80	
EK-4	<i>id.</i>	f.a.h.	GifA-95376	10.830 ± 150	10753 ± 157
EK-4	<i>id.</i>	Carbón	GifA-95228	7.630 ± 80	6485 ± 74
EK-5	Caballo II/ nº 44	Carbón	GifA-95193	6.840 ± 80	5736 ± 67
EK-5	<i>id.</i>	f.a.h.	GifA-95309	11.760 ± 180	11592 ± 217
EK-5	<i>id.</i>	Carbón	GifA-96081	8.040 ± 80	6947 ± 132
EK-5	<i>id.</i>	f.a.h.	GifA-96114	10.960 ± 150	10935 ± 114
EK-6	Caballo II/ nº 29	Carbón	GifA-96089	12.520 ± 100	12687 ± 383
EK-6	<i>id.</i>	f.a.h.	GifA-96115	14.440 ± 230	15749 ± 242